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Douglas J. Raber

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The National Research Council (NRC), through its Board on Chemical Sciences and Technology (BCST) provided the AFOSR Directorate of Chemical and Atmospheric Sciences with external scientific review of research proposals, program assessments, and advice. The work was carried out (with assistance by BCST staff) by volunteer panels that were appointed according to NRC procedures. The scope of these panels included the chemical and atmospheric sciences research programs administered jointly by the Air Force Office of Scientific Research (AFOSR) and the Air Force Astronautics Laboratory. Standing panels were established for three reviewing areas: Atmospheric Sciences, Chemical Sciences, and High Energy Density Materials (HEDM). The purposes of this project were to: assist the AFOSR in evaluating research proposals for scientific merit via peer review, conduct overall evaluations of research programs of the Directorate; and, to undertake special studies upon request by the Directorate, upon approval by the NRC governance.

The three panels conducted convened-group review of 449 research proposals, based on 1,671

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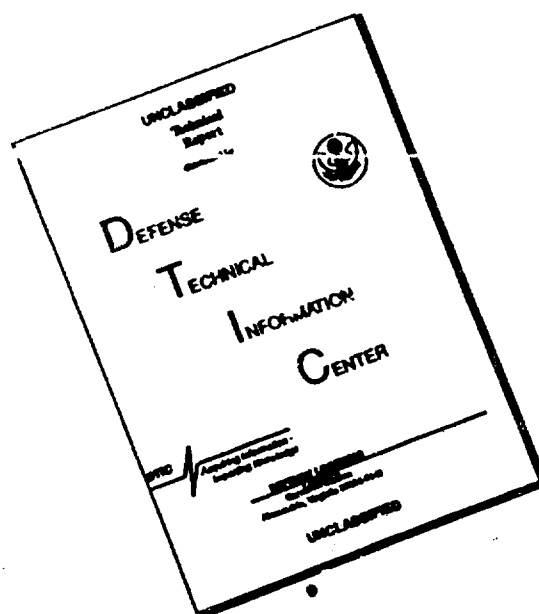
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NATIONAL RESEARCH COUNCIL
COMMISSION ON PHYSICAL SCIENCES, MATHEMATICS, AND APPLICATIONS
201 Constitution Avenue Washington, DC 20418

Report on the Commission's Activities and Accomplishments

Dr. Donald L. Ball
Director of Chemistry and
Materials Sciences
Air Force Office of Scientific Research
Bolling Air Force Base, DC 20332-6448

Dear Dr. Ball:

Enclosed is the final report covering the duration of Contract
No. F49620-87-C-120, September 15, 1987 - October 31, 1990.

Sincerely,


Douglas J. Raber
Staff Director

Enclosure

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NATIONAL ACADEMY OF SCIENCES
NATIONAL RESEARCH COUNCIL
COMMISSION ON PHYSICAL SCIENCES, MATHEMATICS, AND APPLICATIONS
BOARD ON CHEMICAL SCIENCES AND TECHNOLOGY

Evaluation of Chemical and Atmospheric Sciences Research

Work Performed for the Air Force Office of Scientific Research
Directorate of Chemical and Atmospheric Sciences
(the Directorate of Chemistry and Materials Sciences, as of August 1991)

Contractor: National Academy of Sciences
2101 Constitution Avenue, N.W.
Washington, D.C. 20418

Contract No. F49620-87-C-120

Amount: \$595,608

Awarded: On a noncompetitive basis

Sponsoring individual: Philip M. Smith
Executive Officer
National Academy of Sciences
Room 213
2101 Constitution Avenue, N.W.
Washington, D.C. 20418

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The three panels conducted convened-group review of 449 research proposals, based on 1,671 reviews received from 814 reviewers.

Based on research progress reported by the principal investigators at contractors conferences, panelists evaluated the 1988, 1989, and 1990 research program of HEDM, the 1988 and 1990 research program in molecular dynamics, and the 1989 research program surface chemistry. In August 1990 the High Energy Density Panel conducted an evaluation of the in-house research program of the Astronautics Laboratory at Edwards Air Force Base. A special meeting between panelists and Air Force program managers was held in September 1989 to evaluate the scientific progress and prospects of the overall HEDM program.

During the life of this contract, the National Research Council Project staff organized 14 panel meetings and 10 contractors conferences including 4 poster sessions at which 80 posters were presented. The number of participants in the meetings totaled 1,200.

Detailed project reports for the period of this contract are attached.

ADVISORY PANELS TO THE CHEMICAL AND ATMOSPHERIC SCIENCES DIRECTORATE
National Research Council
Washington, D.C. 20418

Progress Report
for Period December 1, 1989 to October 31, 1990

During the period covered by this progress report, three standing panels were active: the AFOSR Atmospheric Sciences Review Panel, the AFOSR High Energy Density Materials Panel, and the AFOSR Chemical Sciences Review Panel.

AFOSR Chemical Sciences Review Panel

The panel, organized in the fall of 1987, met at the National Academy of Sciences on May 2, 1990. During this reporting period the panel and staff organized the November 6, 1990 meeting, held at the Stouffer Concourse Hotel, Denver, Colorado. During the two meeting in 1990, the panel reviewed 48 research proposals for scientific merit.

AFOSR High Energy Density Materials Panel

This panel was organized in the winter of 1987-1988. It held its third meeting February 25-28, 1990 in conjunction with the AFOSR High Energy Density Materials Contractors Meeting at the Hotel Queen Mary in Long Beach, California. Thirteen proposals were reviewed for scientific merit. The panel prepared a report summarizing its observations and evaluation of the scientific work presented at the conference. The fourth meeting of the panel was held August 22-23, 1990. The panel reviewed 28 proposals for scientific merit. The Panel also conducted an informal in-house evaluation of the research program of the Astronautics Laboratory at Edwards Air Force Base.

AFOSR Atmospheric Sciences Review Panel

This panel was formally organized in the fall of 1988. The panel met for the third time on July 23, 1990 at the University of Michigan, Ann Arbor. At that meeting the panel reviewed 41 proposals. Due to the exceptional number of proposals relating to lightning research, nine guests panelists took part in this meeting.

Scientific Conferences

The National Research Council's project staff provide assistance in organizing conferences at which AFOSR-supported research can be presented and discussed. During this report period, the staff provided logistical organization and on-site supervision for the Nonlinear Optical Polymers Contractors Conference held June 3-5, 1990 at the National Academy of Sciences in Washington, D.C., and for the Molecular Dynamics Contractors Conference and concurrent Strategic Defense Initiative Office meeting held October 28-30, 1990 at the Marriott Hotel in Annapolis, Maryland. The staff is currently organizing the HEDM Contractors Conference, to be held February 24-27, 1991 at the Marriott Hotel in Albuquerque, New Mexico, and the Nonlinear Optical Polymers Contractors Conference planned for the fall of 1991.

Program Review

An hoc subgroup of the AFOSR Chemical Sciences Panel prepared an evaluation of the overall progress and direction of the AFOSR Molecular Dynamics Program, based on progress in the research as presented by the contractors at the October 28-30, 1990 conference in Annapolis, Maryland.

ADVISORY PANELS TO THE CHEMICAL AND ATMOSPHERIC SCIENCES DIRECTORATE

Progress Report
for Period May 1 - November 30, 1989

National Research Council
Washington, D.C.

During the period covered by this progress report the three standing panels mentioned below provided peer review of research proposals submitted to the Air Force Office of Scientific Research (AFOSR) and the Astronautics Laboratory (AL). In addition, the High Energy Density Materials Panel (HEDM) evaluated the AFOSR/AL HEDM program. Both the proposal review and program evaluation address only the technical merit of the proposals and the work presented by existing contractors.

Chemical Sciences Review Panel

The panel met on May 19 and November 17 to review a total of 90 research proposals.

High Energy Density Materials Panel (HEDM)

The panel met on September 27-28 to evaluate 21 proposals in the rocket propulsion research area and to examine the scientific progress and prospects of the overall HEDM program. The panel's report on their program evaluation is in review.

Atmospheric Sciences Review Panel

On July 6, the panel reviewed 9 proposals during a telephone conference.

Scientific Conferences

Staff at the National Research Council are providing assistance in organizing conferences at which AFOSR-supported research can be presented and discussed. In addition to the panel meetings mentioned above, assistance was provided for the following meetings:

- o Nonlinear Optical Polymers Contractors Conference
September 24-26, Long Beach, CA
- o Surface Chemistry Contractors Conference
October 29-November 1, Captiva Island, FL

Forecast Report
for Period December 1, 1989 - June 30, 1990

Chemical Sciences Review Panel

The panel will meet on May 2, 1990 to review 31 proposals. Two months prior to the meeting the panel will identify several potential reviewers per proposal.

High Energy Density Materials Panel

The next round of review for proposals in this program is just beginning. The panel met on February 25-28, 1990 in Long Beach, California to evaluate 13 proposals. The panel will meet at Edwards AFB in September 1990 to review an estimated 40 HEDM and condensed-phase proposals and to conduct a review of the AL program.

Atmospheric Sciences Review Panel

This panel will meet on May 11 at the National Academy of Sciences to review 40 proposals, mainly in the lightning research area.

Scientific Conferences

Project staff are working to organize future scientific conferences, including:

- o Nonlinear Optical Polymers Contractors Conference,
June 3-5, 1990, National Academy of Sciences, Washington, D.C.
- o Molecular Dynamics Contractors Conference,
October 1990, East coast.
- o High Energy Density Materials Contractors Conference,
Spring 1991, East coast.

ADVISORY PANELS TO THE CHEMICAL AND ATMOSPHERIC SCIENCES DIRECTORATE

Progress Report
for Period May 1 - November 30, 1989

National Research Council
Washington, D.C.

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October 1990, East coast.
- o High Energy Density Materials Contractors Conference,
Spring 1991, East coast.

ADVISORY PANELS TO THE CHEMICAL AND ATMOSPHERIC SCIENCES DIRECTORATE

Progress Report
for Period October 1, 1988 to April 30, 1989

Robert M. Simon
Staff Director
National Research Council
Washington, D.C. 20418

During the period covered by this progress report, three standing panels were active: the AFOSR Atmospheric Sciences Review Panel, the AFOSR High Energy Density Materials Panel, and the AFOSR Chemical Sciences Review Panel.

AFOSR Chemical Sciences Review Panel

The panel, which was organized in the fall of 1987, met at the Sheraton-Denver Airport on November 18, 1988. The next meeting of the panel is scheduled for May 19, 1989 in Washington, D.C. In the period from October 1 through April 30, panel members were engaged in the review of 88 research proposals for scientific merit.

AFOSR High Energy Density Materials Panel

This panel was organized in the winter of 1987-1988. It held its second meeting from March 12-16, 1989 at the Sheraton-New Orleans Hotel in conjunction with the AFOSR/AFAL High Energy Density Materials Contractors Conference. Twenty-four proposals were reviewed (an additional four were deferred for mail review) for scientific merit, and the panel drafted a report summarizing its observations and evaluation of the scientific work presented at the conference. The report is currently in review.

AFOSR Atmospheric Sciences Review Panel

This panel was formally organized in the fall of 1988 and held its first meeting on January 19, 1989 in Washington, D.C. To date, it has reviewed 16 proposals.

Scientific Conferences

Staff at the National Research Council are providing assistance in organizing conferences at which AFOSR-supported research can be presented and discussed. During this report period, assistance was provided in organizing the 1988 Molecular Dynamics Contractors' Conference (October 31-November 2, 1988 at the Newporter Resort, Newport Beach, California) and the 1989 HEDM Contractors' Conference (March 12-16, 1989 at the Sheraton Hotel in New Orleans, Louisiana).

Forecast Report
for Period May 1, 1989 to September 30, 1989

AFOSR Chemical Sciences Review Panel

Six proposals for a University Research Initiative in high vacuum science have been received for review. The deadline date for the Fall 1989 round of review for the Chemical Sciences program is August 1, and work in identifying potential reviewers is anticipated during that month and September.

AFOSR High Energy Density Materials Panel

A second round of review for proposals in this program is being established. The deadline date for receipt of proposals is June 1, and work in reviewing these proposals is anticipated for this summer. The Panel will meet on September 27-28 to evaluate the proposals and to consider recommendations for additional areas in which the HEDM program can develop.

AFOSR Atmospheric Sciences Review Panel

Nine additional proposals are in hand for review this summer. The panel may meet this fall to consider them or may conduct its discussion by conference telephone call.

Scientific Conferences

Project staff are working to organize future scientific conferences, including:

Non-Linear Optical Polymers Contractors Conference, September 24-26, 1989, in Long Beach, California;
Surface Chemistry Contractors Conference, October 22-25, 1989, Captiva Island, Florida; and
1990 HEDM Contractors Conference, February 25-28, 1990 in Long Beach, California.

ADVISORY PANELS TO THE CHEMICAL AND ATMOSPHERIC SCIENCES DIRECTORATE

Progress Report
for Period April 1, 1988 to September 30, 1988

Robert M. Simon
Staff Director
National Academy of Sciences
Washington, D.C. 20418

During the period covered by this progress report, three standing panels were active, the Atmospheric Sciences Review Panel, the High Energy Density Materials Panel, and the Chemical Sciences Review Panel.

Chemical Sciences Review Panel

This panel was appointed in the fall of 1987 and held its first meeting on December 8, 1987 at the National Academy of Sciences. A second meeting on May 12, 1987 resulted in the review of 55 proposals. The panel will hold its third meeting at the Sheraton in Denver, Colorado on November 18, 1988. The panel reviews for scientific merit proposals submitted to the Air Force in the chemical sciences.

High Energy Density Materials Panel

This panel was appointed in the winter of 1987-1988 and held its first meeting on February 29-March 2, 1988. A suite of proposals were reviewed on March 2, and a report on the technical progress of the Air Force High Energy Density Materials Program was in review at the end of September. (It was transmitted on November 17, 1988.) The panel has two meetings scheduled; a meeting will be held on March 12-16, 1989 at the Sheraton Hotel in New Orleans, Louisiana; with a third meeting to be held February 25-28, 1990 in Long Beach, California.

Atmospheric Sciences Review Panel

Proposals received in 1987 were evaluated with the assistance of reviewers identified by Dr. James Holton of the University of Washington. A separate panel for this program has been appointed (see attached roster). The panel is reviewing proposals, with the goal of a fall 1988 meeting in Washington, DC.

Contractor Conferences

The National Research Council is helping to organize a number of AFOSR Contractor Conferences as part of this contract. The AFOSR/AFAL HEDM Contractors Conference, held February 29-March 2 in Newport Beach, California, was the first such conference organized. The NLO Materials Contractors Conference was held April 20-21, 1988, at the National Academy of Sciences, Washington, D.C.

Future conferences are being organized, including:

Molecular Dynamics Contractors Conference, October 31-November 2, 1988,
at the Newporter Resort, Newport Beach, California
HEDM Contractors Conference, March 12-16, 1989, at the Sheraton Hotel in
New Orleans, Louisiana
Non-Linear Optical Polymers Contractors Conference, September 24-26, 1989,
in Long Beach, California
Surface Chemistry Contractors Conference, October 22-25, 1989, Captiva Island,
Florida
HEDM Contractors Conference, February 25-28, 1990 in Long Beach, California.

ADVISORY PANELS TO THE CHEMICAL AND ATMOSPHERIC SCIENCES DIRECTORATE

Progress Report
for Period September 15, 1987 to March 31, 1988

Robert M. Simon
Staff Director

National Academy of Sciences
Washington, D.C. 20418

During the period covered by this progress report, two of three anticipated standing panels were set up.

Chemical Sciences Review Panel

This panel was appointed in the fall of 1987 and held its first meeting on December 8, 1987 at the National Academy of Sciences; a second meeting is scheduled for May 12, 1988 at the National Academy of Sciences; with a third meeting at the Sheraton Hotel in Denver, Colorado. The panel reviews proposals submitted to the Air Force in the chemical sciences for scientific merit.

High Energy Density Materials Panel

This panel was appointed in the winter of 1987-1988 and held its first meeting on February 29-March 2, 1988. A suite of proposals were reviewed on March 2, and a report on the technical progress of the Air Force High Energy Density Materials Program is in preparation.

Atmospheric Sciences Review Panel

Proposals received in 1987 were evaluated with the assistance of reviewers identified by Dr. James Holton of the University of Washington. A separate panel for this program is being appointed in April 1988.

Contractor Conferences

The National Research Council is helping to organize a number of AFOSR Contractor Conferences as part of this contract. The AFOSR/AFAL HEDM Contractors Conference, held February 29-March 2 in Newport Beach, California, was the first such conference organized.

Future conferences are being organized, including:

NLO Materials Contractors Conference, April 20-21, 1988, Washington, D.C.

Molecular Dynamics Contractors Conference, October 31-November 2, 1988,
Newport Beach, California

HEDM Contractors Conference, March 1989, New Orleans, Louisiana

Surface Chemistry Contractors Conference, Fall 1989, Location TBA